

IETF 115 – TEAS Meeting

Applicability of ACTN to Packet Optical Integration (POI) extensions to support Router Optical interfaces.
draft-mix-teas-actn-poi-extension-00

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Motivation



The full automation of the multilayer/multidomain network is a requirement in the industry and the service providers.

The network is typically composed by multiple layers: e.g. IP/MPLS, (with Segment Routing) and the Optical ones.

The requirements of high bandwidth availability and dynamic control of the networks are of capital importance too, see draft-ietf-teas-actn-poi-applicability.

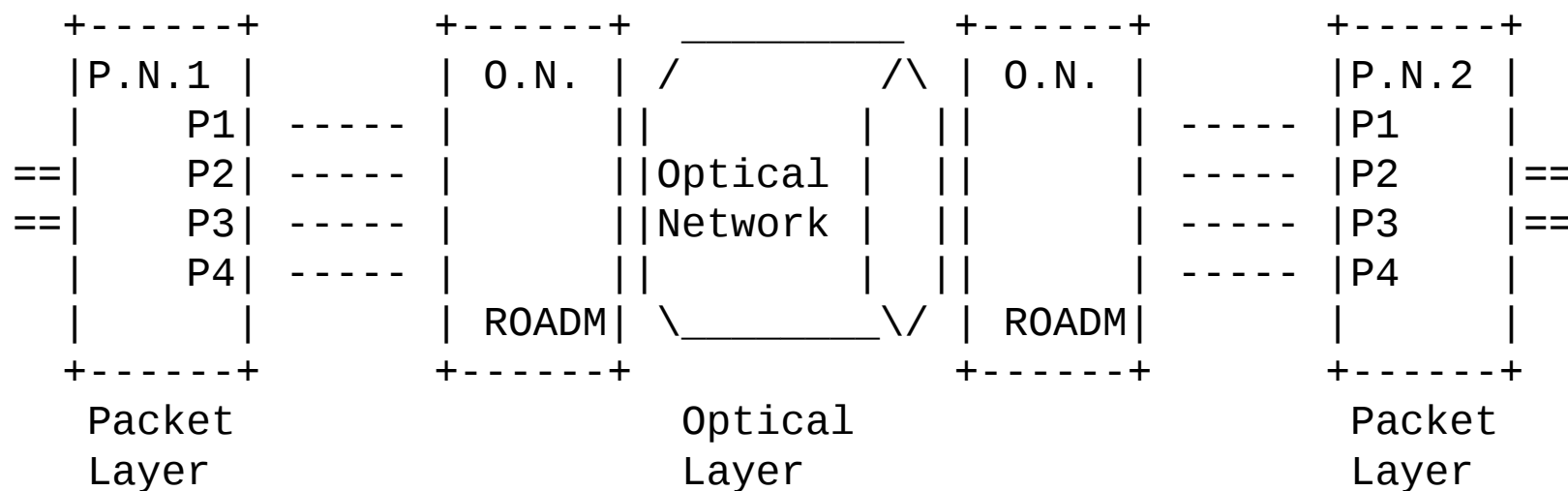
New DWDM Coherent pluggable optics, such as ZR [OIF-400ZR-01-0] and ZR+ [Open_ZR-Plus_MSA], are enabling new multilayer network use cases where the DWDM interface is located within the packet domain equipment instead of being part of the Optical domain.

The way the DWDM pluggable are in general managed across different layers and PNCs is not yet completely specified and defined by any standard and is becoming an urgent matter to cover for Service Providers. (e.g. IETF, OpenConfig define the device models suitable to manage the pluggable but don't say how the information can be shared between O-PNC and P-PNC)

Full end-to-end management solution of these DWDM coherent pluggable optics, leveraging on ACTN hierarchical architecture, is becoming critical to allow a wider deployment.

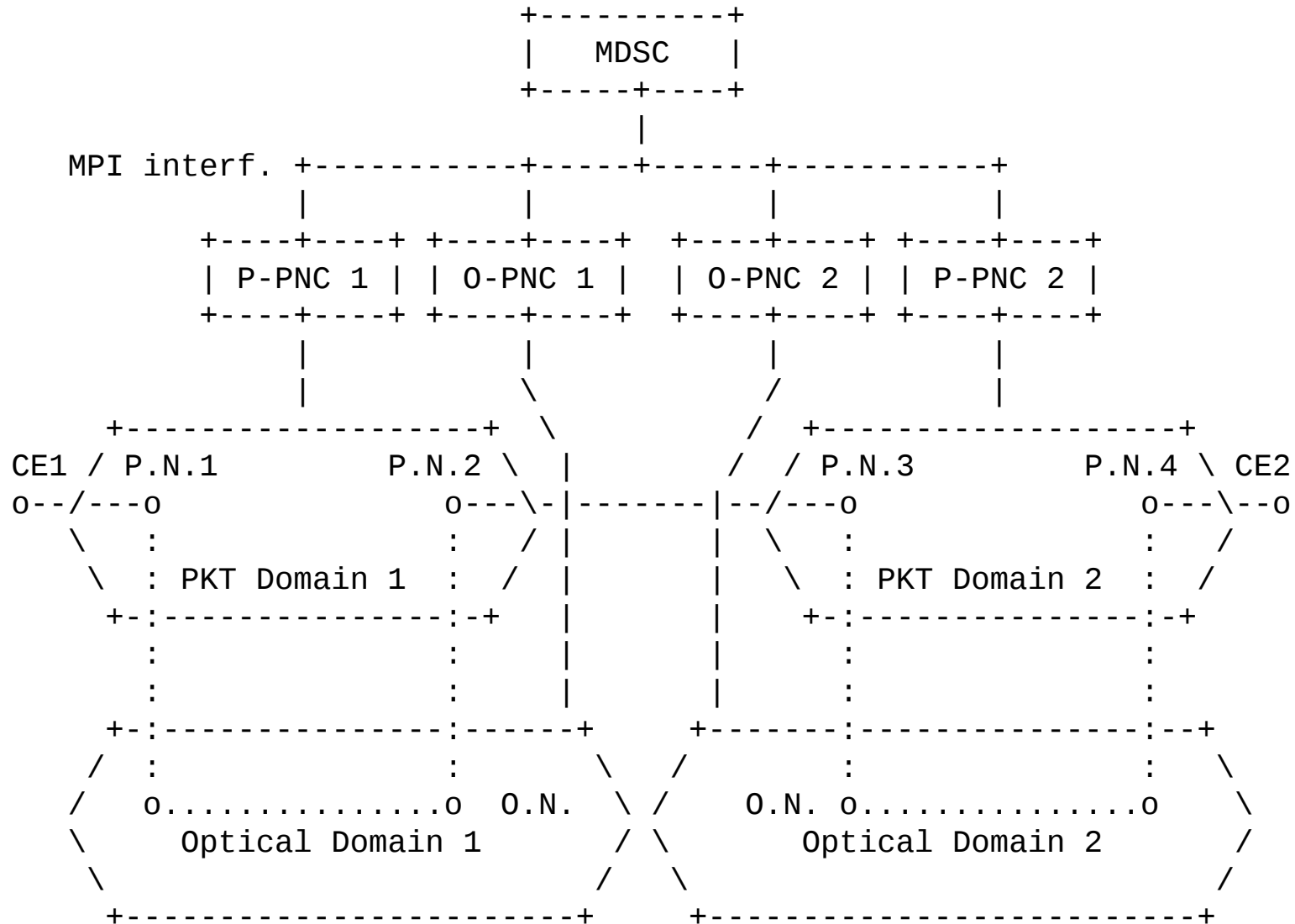
Document Scope

- Propose a set of use cases addressing the Pluggable optics located in Router and under the Packet PNC control .
- Identify the IETF YANG models to support this deployments and define missing ones.
- The network architecture is represented in the picture:



P.N. = Packet Node (ROADM)
 O.N. = Optical DWDM Node
 ROADM = Lambda/Spectrum switch
 Px = DWDM (coherent pluggable) Router ports

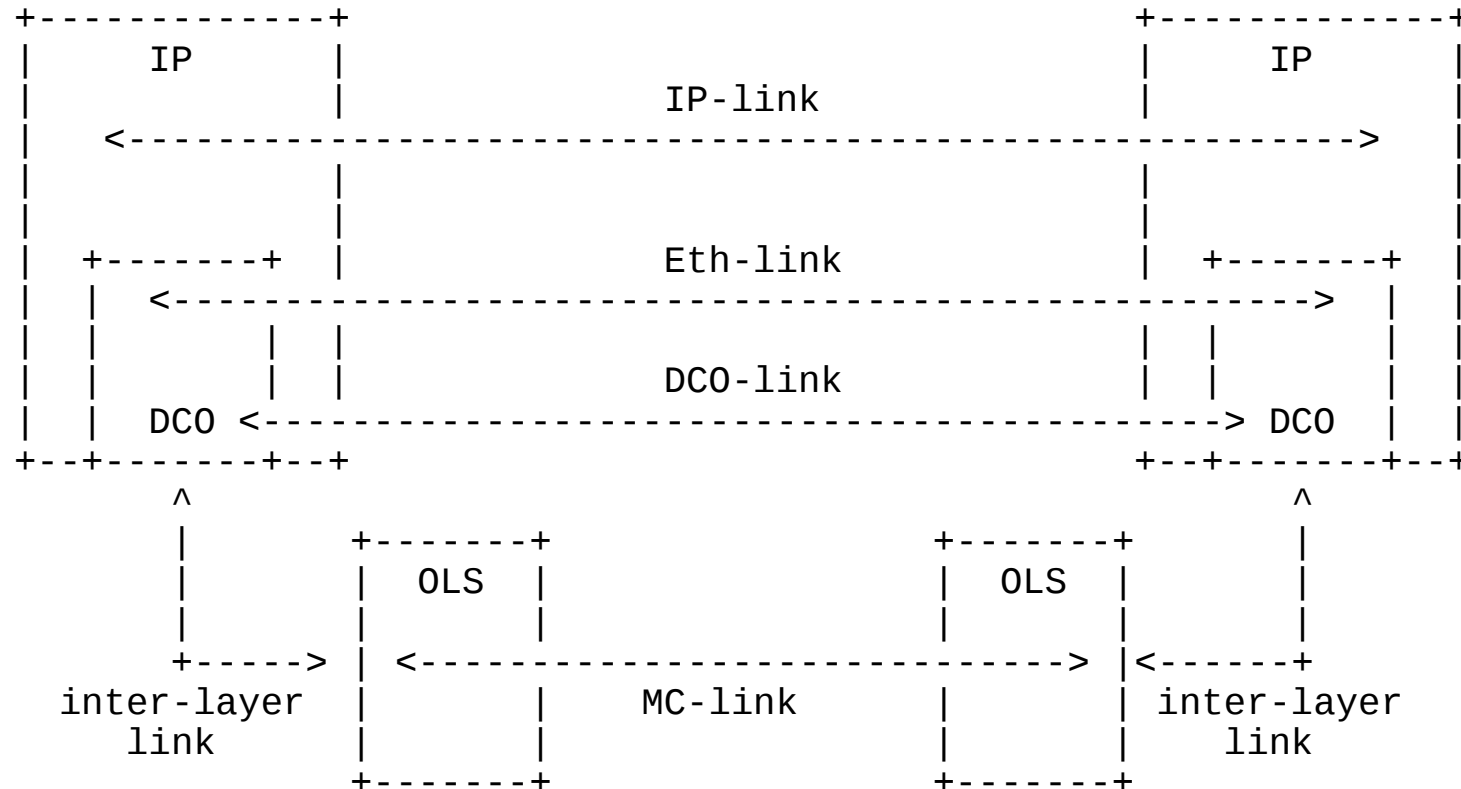
ACTN solution



The supported services



The different services supported by the network are shown below.



- IP-link = IP service, out of this document scope
- Eth-link = Ethernet connection
- DCO-link = Pluggable connection (OTSi connection)
- MC-link = Media Channel link (MC optical circuit)

The supported use cases



Inter Layer Link discovery and provisioning

The inter-layer links are the interconnections (fiber) between the pluggable ports (in the Packet Layer) and the ROADMs ports (in the Optical Layer). They are set in the Packet and DWDM nodes either manually (e.g. CLI) or via PNCs. The values identifying the inter layer links may be defined by MDSC which has the visibility of both IP and Optical layers.

Network topology discovery and provisioning

MDSC retrieves the packet network topology from the P-PNC and the optical network topology from the O-PNC. MDSC collects and rebuilds the service topology based on the services information coming from P-PNC and O-PNC as described in draft-ietf-teas-actn-poi- applicability. [I-D.draft-ietf-teas-actn-poi-applicability]

End to End Packet service provisioning / deletion

MDSC is asked to set a Packet service between two Routers requiring additional connectivity bandwidth.

Optical Circuit provisioning / deletion

MDSC is asked to set an Optical Circuit between two router ports (O-PNC will receive the same request from MDSC). This is specially needed during the network installation to provide Connectivity between two Routers, the IP link will be set up later using this optical circuit.

LAG extension

MDSC is asked to extend a service bandwidth. This may require more Router optical connectivity.

Optical Restoration

O-PNC detects an optical network failure and reroutes the optical circuits to a different path (and lambda).

Network Maintenance Operations

MDSC is asked to isolate part of the optical network for maintenance and coordinate the O-PNC and P-PNC to preserve the traffic during the maintenance operation.

Next steps



- Address new use cases like:
 - End to End Performance management KPI
 - End to End Alarm Correlation at MDSC
- Open to new authors and contributors
- Keep alignment on draft-ietf-teas-actn-poi-applicability
- Get feedbacks and consensus from the team
- Define the (Yang) models to support the Pluggables in Routers.
- Start discussion how to progress to a WG adoption